IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant:	Kevin M. Ferguson
Serial No.:	09/992,051
Filed:	November 21, 2001
For:	HUMAN VISION MODEL BASED SLOW MOTION INTERPOLATION
Examiner:	Trang U. Tran
Art Unit:	2622
Confirmation No.:	4466

Appeal Brief in Accordance With 37 C.F.R. § 41.37

Mail Stop Appeal Brief- Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This is an appeal from the Examiner's rejection of the above-identified application dated November 14, 2008.

Appellant hereby requests a four month extension of time. Please charge the one thousand seven hundred thirty dollar ($1,730) fee under 37 C.F.R. § 1.17(a)(4) to Deposit Account 20-0352.

No additional fee is believed due. However, if an additional fee is due please charge that fee to Deposit Account 20-0352.

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Real Party in Interest

The real party in interest in this case is Appellant's assignee, Tektronix, Inc., an Oregon corporation, which is a subsidiary of Danaher Corporation, a Delaware Corporation.

Related Appeals and Interferences

There are no prior and pending appeals, interferences or judicial proceedings known to Appellant, Appellant's legal representative or assignee which may be related to, directly affect or have a bearing on the Board's decision in this appeal.

Status of Claims

Claims 1-6 stand rejected under 35 U.S.C. § 103(a) and are being appealed.

Status of Amendments

No amendments have been submitted by Appellant after the Examiner's final rejection.

Summary of Claimed Subject Matter

Independent claim 1 is in means plus function form. An apparatus for providing a smooth interpolated video signal at any desired rate from a slower rate video signal comprises:

means for up-sampling the slower rate video signal to the desired rate; (See frame rate converter 12, shown in Figure 1 and described at page 2, line 21) and

means for adaptively filtering the up-sampled slower rate video signal using a human vision model to produce the smooth interpolated video signal. (See three-dimensional (3-D) human vision model (HVM) adaptive filter 14, shown in Figure 1 and described in detail at page 2, line 23 – page 3, line 23. As described at page 3, lines 17-23, the 3-D HVM adaptive filter 14 is a plurality of filters arranged in a recursive architecture.)

Independent claim 3 is analogous to claim 1 but in apparatus form. An apparatus for providing a smooth interpolated video signal at any desired rate from a slower rate video signal comprises:

a frame converter for up-sampling the slower rate video signal to produce an up-sampled video signal at the desired rate; (See frame rate converter 12, shown in Figure 1 and described at page 2, line 21) and

an adaptive filter based on a human vision model for interpolating the up-sampled video signal to produce the smooth interpolated video signal. (See three-dimensional (3-D) human vision model (HVM) adaptive filter 14, shown in Figure 1 and described in detail at page 2, line 23 – page 3, line 23. As described at page 3, lines 17-23, the 3-D HVM adaptive filter 14 is a plurality of filters arranged in a recursive architecture.

Independent claim 5 is analogous to claim 1 but in method form. A method of providing a smooth interpolated video signal at any desired rate from a slower rate video signal comprises the steps of:

up-sampling the slower rate video signal to the desired rate to produce an up-sampled video signal; (See frame rate converter 12, shown in Figure 1 and described at page 2, line 21) and

adaptively filtering the up-sampled video signal according to a human vision model to produce the smooth interpolated video signal. (See three-dimensional (3-D) human vision model (HVM) adaptive filter 14, shown in Figure 1 and described in detail at page 2, line 23 – page 3, line 23. As described at page 3, lines 17-23, the 3-D HVM adaptive filter 14 is a plurality of filters arranged in a recursive architecture.

Grounds of Rejection to be Reviewed on Appeal

Whether claims 1-6 are unpatentable under 35 U.S.C. § 103(a) as being rendered obvious by Yang (U.S. Patent No. 6,573,940) in view of De Haan et al. (U.S. Patent No. 6,122,016) ("De Haan").

Argument

Rejection of Claims 1-6 under 35 U.S.C. § 103(a)

The Examiner rejected claims 1-6 under 35 U.S.C. § 103(a) as being rendered obvious by Yang in view of De Haan.

Appellant respectfully traverses and asserts that the Examiner has failed to establish a *prima facie* case of obviousness because the Examiner has failed to properly ascertain the scope and content of Yang and De Haan. *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398 (2007).

Regarding independent claims 1, 3, and 5, neither Yang nor De Haan nor their combination teaches or suggests the claim limitation "adaptively filtering . . . using a human vision model."

A "human vision model" is a term of art well known to those of ordinary skill in the art of video signal processing. It denotes a machine vision model which is designed to match the perceptual response of the human vision system. For example, see U.S. Patent No. 5,477,345 to Tse which has an optical sensor array having colored optical filters designed "such that its spectral response matches the tristimulus response of the human eye as closely as possible." (Tse, column 10, lines 47-51) For another example, see the JPEG compression standard which quantizes high frequency detail more heavily than low frequency detail in order to minimize data size without a perceptible loss of quality, based on the fact that human eyes are less sensitive to high frequency detail. (See http://en.wikipedia.org/wiki/JPEG) For a detailed discussion regarding human vision models, see U.S. Patent No. 6,907,143, which is referenced in Appellant's specification at page 2, line 24.

The Examiner has alleged obviousness under two different theories:

First, in the Non-Final Rejection dated May 16, 2008 the Examiner alleged that Yang's filter 112 describes a "human vision model" because it "removes artifacts ('noise') from the video image which are visible to a human viewer." (Office Action dated May 16, 2008, page 3) Appellant respectfully disagrees because the mere fact that a video signal processing step produces a result that is visible does not mean that it uses a "human vision model." Yang's filter 112 does not model the perceptual response of the human vision system in any way. Yang's filter 112 merely "removes spectral components introduced by the zero-packing" (Yang, column 4, line 15) without any consideration whatsoever of how the human eye perceives the spectral components.

Second, in the Final Rejection dated November 14, 2008 the Examiner changed position and alleged that De Haan describes "a human vision model." Specifically, the Examiner writes:

> "De Haan et al discloses in col. 9, lines 23-34 that 'The present implementation of the invention can also be used in a method of reducing interference artifacts in television pictures, which often introduce a single dominant sine-wave in a single direction which corresponds to a single peak in the two-dimensional frequency domain. By means of a partial block transform, it is possible to obtain the frequency coefficient(s) representing this interference, and to correct the signal with the difference between the inverse transform of the temporally filtered version of this or these coefficients and that of the original one . . .' From the above passage, obtaining the frequency coefficient(s) representing the interference is **model** and this model is for human vision because this model is used for reducing interference artifacts in television pictures. Thus, the adaptive filtering of De Haan et al is a human vision model . . ." (Office Action dated November 14, 2008, pages 2-3, bold in original, underlining added by Appellant)

Appellant respectfully disagrees with the Examiner's conclusion (underlined above) because De Haan's method of reducing interference is not designed to match the perceptual response of the human vision system in any way. De Haan's partial block transform and temporal filter operate without any consideration whatsoever of how the human eye perceives the interference. Indeed, De Haan does not mention the human perceptual response once in his entire disclosure.

Appellant notes that the Examiner's assertion above "obtaining the frequency coefficient(s) representing the interference is [a] **model**" (bold in original) misses the point. Even if De Haan's frequency coefficients do constitute a model, it is only a model of the interference—*not* the human vision system.

For these reasons, claims 1, 3, and 5, as well as claims 2, 4, and 6 which depend from them respectively, are not rendered obvious by Yang in view of De Haan. Accordingly, Appellant requests that the rejection of claims 1-6 under 35 U.S.C. § 103(a) be reversed.

Conclusion

For all these reasons, Appellant requests that the Examiner's rejection of claims 1-6 be reversed, and that this case be passed on to issuance.

Respectfully submitted,
Kevin M. Ferguson

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July 20, 2009

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Claims Appendix

1. (Previously Presented) An apparatus for providing a smooth interpolated video signal at any desired rate from a slower rate video signal comprising:

means for up-sampling the slower rate video signal to the desired rate; and

means for adaptively filtering the up-sampled slower rate video signal using a human vision model to produce the smooth interpolated video signal.

2. (Original) The apparatus as recited in claim 1 further comprising means for restoring a direct current level for the smooth interpolated video signal.

3. (Previously Presented) An apparatus for providing a smooth interpolated video signal at any desired rate from a slower rate video signal comprising:

a frame converter for up-sampling the slower rate video signal to produce an up-sampled video signal at the desired rate; and

an adaptive filter based on a human vision model for interpolating the up-sampled video signal to produce the smooth interpolated video signal.

4. (Previously Presented) The apparatus as recited in claim 3 further comprising a direct current restorer having as inputs the smooth interpolated video signal from the adaptive filter and the up-sampled video signal for restoring a direct current level in the smooth interpolated video signal.

5. (Previously Presented) A method of providing a smooth interpolated video signal at any desired rate from a slower rate video signal comprising the steps of:

up-sampling the slower rate video signal to the desired rate to produce an up-sampled video signal; and

adaptively filtering the up-sampled video signal according to a human vision model to produce the smooth interpolated video signal.

6. (Original) The method as recited in claim 5 further comprising the step of restoring a direct current level in the smooth interpolated video signal as a function of the up-sampled video signal.

Evidence Appendix

No evidence was submitted pursuant to 37 C.F.R. §§ 1.130, 1.131 or 1.132, and no other evidence was entered by the Examiner.

Related Proceedings Appendix

There are no related proceedings identified in this Brief.